

IN THE CLAIMS

1. (Previously Presented)

A fuel pump module for a fuel tank, comprising:

a reservoir;

an electric motor driven high pressure fuel pump having a fuel inlet and having a high pressure fuel outlet supplying high pressure fuel to an engine;

a jet pump having a fuel inlet communicating with the fuel tank, a fuel outlet supplying fuel to the reservoir, and a jet nozzle of the jet pump having an outlet and an inlet connected through a conduit with the high pressure fuel outlet upstream of the engine for receiving high pressure fuel from the high pressure fuel pump for fuel flow through the inlet and outlet of the nozzle to entrain fuel through the inlet of the jet pump and discharge the entrained fuel through the outlet of the jet pump and into the reservoir; and

at least one restrictor plate received in the conduit between and in fluid communication with the high pressure fuel pump and the inlet of the jet nozzle, the restrictor plate having an orifice upstream of the inlet of the jet nozzle and restricting the flow of high pressure fuel flowing from the high pressure fuel pump through the inlet of the jet nozzle.

2. (Previously Presented)

The fuel pump module of claim 1 wherein the reservoir has an inlet for fuel from a fuel tank and the outlet of the nozzle is generally adjacent the inlet of the jet pump.

3. (Previously Presented)

The fuel pump module of claim 1 wherein the reservoir has an inlet and the jet pump has a first venturi axially spaced from the nozzle generally between the nozzle and the inlet of the reservoir, the first venturi having an inlet in fluid communication with the outlet of the nozzle to receive fuel discharged from the outlet of the nozzle, and having an outlet through which fuel is discharged generally toward the inlet of the reservoir.

4. (Previously Presented)

A fuel pump module, comprising:

a reservoir having an inlet;

a high pressure fuel pump having an inlet communicating with the reservoir and having an outlet of pressurized fuel;

a nozzle having an outlet and an inlet in fluid communication with the outlet of the high pressure fuel pump for fuel flow therebetween;

at least one restrictor plate received between the outlet of the fuel pump and the inlet of the nozzle, the restrictor plate having an orifice restricting the flow of fuel flowing to the nozzle;

a first venturi axially spaced from the nozzle generally between the nozzle and the inlet of the reservoir, the first venturi having an inlet in fluid communication with the

outlet of the nozzle to receive fuel discharged from the outlet of the nozzle, and having an outlet through which fuel is discharged; and

a second venturi having an inlet in fluid communication with the outlet of the first venturi to receive fuel discharged from the first venturi, and having an outlet through which fuel is discharged generally toward the inlet of the reservoir.

5. (Original)

The fuel pump module of claim 4 wherein the first venturi and the second venturi are constructed as a single piece of material.

6. (Previously Presented)

The fuel pump module of claim 1 which also comprises
a pair of restrictor plates axially spaced from one another and received between the outlet of the high pressure fuel pump and the inlet of the nozzle; and
each of the restrictor plates having an orifice restricting the flow of fuel flowing to the nozzle.

7. (Previously Presented)

The fuel pump module of claim 1 which also comprises a return fuel line extending generally between the outlet of the nozzle and the reservoir.

8. (Original)

The fuel pump module of claim 7 wherein the reservoir has an inlet and the return fuel line extends generally adjacent the inlet of the reservoir.

9. (Previously Presented)

A fuel pump module, comprising:

a reservoir;

a high pressure fuel pump having an inlet communicating with the reservoir and having an outlet of pressurized fuel;

a nozzle having an outlet and an inlet in fluid communication with the outlet of the high pressure fuel pump for fuel flow therebetween;

at least one restrictor plate received between the outlet of the fuel pump and the inlet of the nozzle, the restrictor plate having an orifice upstream of the inlet of the nozzle and restricting the flow of fuel flowing to the nozzle;

a first venturi operably connected to the nozzle downstream from the nozzle and the first venturi providing entrainment of fuel adjacent the first venturi into the first stream of fuel to provide a second stream of fuel having a second volume and discharged from the first venturi, the second volume being greater than the first volume; and

a second venturi axially spaced downstream from the first venturi providing entrainment of fuel adjacent the second venturi into the second stream of fuel exiting the first venturi to provide a third stream of fuel having a third volume and discharged from the second venturi, the third volume being greater than the second volume and the third stream being delivered to the reservoir.

10. (Previously Presented)

The fuel pump module of claim 9 wherein the first venturi and the second venturi are operably connected to one another.

11. (Previously Presented)

The fuel pump module of claim 10 wherein the first venturi and the second venturi are constructed as a single piece of material.

12. (Canceled)

13. (Previously Presented)

The fuel pump module of claim 4 wherein a pair of restrictor plates axially spaced from one another is arranged upstream of said nozzle.

14. (Previously Presented)

The fuel pump module of claim 4 comprising a fuel line in fluid communication with the second venturi and communicating fuel exiting the second venturi generally toward the reservoir.

15. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source of high pressure fuel having a fuel inlet in one portion of the fuel tank and an outlet of high pressure fuel supplied to an engine;

a jet pump with an outlet, an inlet disposed in another portion of the fuel tank spaced from the one portion of the fuel tank and the fuel inlet of the source, and a nozzle having an inlet connected with the outlet of the source of high pressure fuel upstream of the engine to receive high pressure fuel from the source, and an outlet through which fuel is discharged;

at least one restrictor plate having an orifice connected through a conduit with the outlet of high pressure fuel of the source upstream of the engine, disposed between the source of high pressure fuel upstream of the engine and the inlet of the nozzle and axially spaced upstream from the inlet of the nozzle to restrict the flow of high pressure fuel to the nozzle; and

a first venturi having an inlet in communication with the another portion of the fuel tank and with the outlet of the jet pump nozzle to receive fuel discharged from the nozzle, and an outlet through which fuel is discharged from the first venturi, the flow of fuel from the nozzle to the first venturi causing fuel to move from the another portion of the fuel tank into the inlet of the first venturi.

16. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source having an outlet of pressurized fuel;

a jet pump with a nozzle disposed in one portion of the fuel tank, having an inlet in communication with the outlet of the source of pressurized fuel to receive pressurized fuel, and an outlet through which fuel is discharged;

at least one restrictor plate having an orifice communicating through a conduit with the outlet of the source of pressurized fuel, disposed between said outlet of the source of pressurized fuel and the inlet of the nozzle and axially spaced upstream from the inlet of the nozzle;

a first venturi having an inlet in communication with one portion of the fuel tank and with the outlet of the nozzle to receive fuel discharged from the nozzle, and an outlet through which fuel is discharged from the first venturi, the flow of fuel from the nozzle to the first venturi causing fuel to move from said one portion of the fuel tank into the inlet of the first venturi; and

a second venturi having an inlet in communication with said one portion of the fuel tank and with the outlet of the first venturi to receive fuel discharged from the first venturi, and an outlet in communication with another portion of one of the fuel tank and a reservoir to move fuel from said second venturi to said one of another portion of the fuel tank and the reservoir, the flow of fuel between the first venturi and second venturi causing fuel to move from said one portion of the fuel tank into the inlet of the second venturi.

17. (Original)

The fuel transfer arrangement of claim 15 wherein the fuel discharged from the outlet of the nozzle flows at a first flow rate and the fuel discharged from the outlet of the first venturi flows at a second flow rate, the second flow rate being greater than the first flow rate.

18. (Previously Presented)

The fuel transfer arrangement of claim 16 wherein the fuel discharged from the outlet of the nozzle flows at a first flow rate and the fuel discharged from the outlet of the first venturi flows at a second flow rate, the second flow rate being greater than the first flow rate and the fuel discharged from the outlet of the second venturi flows at a third flow rate, the third flow rate being greater than the second flow rate.

19. (Previously Presented)

The fuel transfer arrangement of claim 15 wherein the inlets and outlets of the nozzle and first venturi are co-axially aligned.

20. (Previously Presented)

The fuel transfer arrangement of claim 16 wherein the outlet of the nozzle and the inlet of the first venturi are axially spaced from one another and the outlet of the first venturi and the inlet of the second venturi are axially spaced from one another.

21. (Original)

The fuel transfer arrangement of claim 15 wherein the source of pressurized fuel is a high pressure fuel pump having an outlet through which fuel is discharged under pressure and the inlet of the nozzle receives a portion of the fuel discharged from the high pressure fuel pump.

22. (Canceled)

23. (Previously Presented)

The fuel transfer arrangement of claim 15 wherein the pressurized fuel between said source and the restrictor plate has one pressure and the pressurized fuel between the restrictor plate and the nozzle has another pressure, said one pressure being greater than said another pressure.

24. (Canceled)

25. (Previously Presented)

The fuel transfer arrangement of claim 15 wherein a pair of restrictor plates restricts the flow of pressurized fuel between said source and the nozzle.

26. (Original)

The fuel transfer arrangement of claim 25 wherein the pair of restrictor plates are axially spaced from one another and from the nozzle.

27. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source having an outlet of pressurized fuel;

a jet pump with a nozzle disposed in one portion of the fuel tank, having an inlet in communication with the outlet of the source of pressurized fuel to receive pressurized fuel, and an outlet through which fuel is discharged;

a pair of restrictor plates each having an orifice, communicating through a conduit with the outlet of the source of pressurized fuel, disposed between said outlet of the source of pressurized fuel and the inlet of the nozzle axially spaced upstream from the inlet of the nozzle and restricting the flow of pressurized fuel between the source and the nozzle;

a first venturi having an inlet in communication with one portion of the fuel tank and with the outlet of the nozzle to receive fuel discharged from the nozzle, and an outlet through which fuel is discharged from the first venturi, the flow of fuel from the nozzle to the first venturi causing fuel to move from said one portion of the fuel tank into the inlet of the first venturi; and the pressurized fuel between said source and one of the restrictor plates has a first pressure and the pressurized fuel between the restrictor plates has a second pressure and the pressurized fuel between another of the restrictor plates and the nozzle has a third pressure, the first pressure being greater than the second pressure and the second pressure being greater than the third pressure.

28. (Previously Presented)

The fuel transfer arrangement of claim 25 wherein the nozzle has a passage with a diameter, the passage defining the inlet and the outlet of the nozzle, and the orifices have diameters, the diameter of the passage in the nozzle being equal to or less than the diameters of the orifices.

29. (Previously Presented)

The fuel transfer arrangement of claim 15 wherein the nozzle has a passage with a diameter, the passage defining the inlet and the outlet of the nozzle, and the orifice has a diameter, the diameter of the passage in the nozzle being greater than, equal to or less than the diameter of the orifice.

30. (Previously Presented)

The fuel transfer arrangement of claim 16 wherein the first venturi and the second venturi are formed as a single piece of material.

31. (Original)

The fuel transfer arrangement of claim 30 wherein the first venturi and the second venturi are injection molded.

32. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source having an outlet of high pressure fuel supplied to an engine;

a jet pump having a fuel inlet, a fuel outlet downstream of the fuel inlet, and a jet nozzle disposed in one portion of the fuel tank, the jet nozzle having an inlet connected with the outlet of high pressure fuel of the source upstream of the engine to receive pressurized fuel from the source upstream of the engine, and an outlet through which fuel is discharged to entrain fuel from the fuel inlet of the jet pump and discharge the entrained fuel through the outlet of the jet pump; and

at least one restrictor plate having an orifice connected with the outlet of the source of pressurized fuel upstream of the engine, disposed between said outlet of the source of pressurized fuel upstream of the engine and the inlet of the nozzle, axially spaced upstream from the inlet of the nozzle, restricting the flow of high pressure fuel to the nozzle and the pressure of the pressurized fuel upstream of the restrictor plate being greater than the pressure of the fuel between the restrictor plate and the inlet of the nozzle.

33. (Cancelled)

34. (Canceled)

35. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source of pressurized fuel supplied to an engine;

a jet pump with a nozzle disposed in one portion of the fuel tank, having an inlet connected with the source of pressurized fuel upstream of the engine to receive pressurized fuel from the source upstream of the engine, and an outlet through which pressurized fuel is discharged;

at least one restrictor plate having an orifice connected with the source of pressurized fuel upstream of the engine, disposed between said source and the nozzle, axially spaced upstream from the inlet of the nozzle and restricting the flow of pressurized fuel to the nozzle; and

wherein a pair of orifices communicate with the source of high pressure fuel between said source upstream of the engine and the nozzle of the jet pump.

36. (Previously Presented)

The fuel transfer arrangement of claim 35 wherein the orifices of the pair of orifices are axially spaced from one another.

37. (Previously Presented)

A fuel transfer arrangement for transferring fuel from one portion of a fuel tank to another portion of a fuel tank spaced from said one portion, comprising:

a source of pressurized fuel;

a nozzle disposed in one portion of the fuel tank, having an inlet in communication with the source of pressurized fuel to receive pressurized fuel, and an outlet through which fuel is discharged;

at least one restrictor plate having an orifice communicating with the source of pressurized fuel, disposed between said source and the nozzle and axially spaced upstream from the inlet of the nozzle;

a pair of orifices communicate with the source of high pressure fuel between said source and the nozzle; and

the pressurized fuel between said source and one of the orifices has a first pressure and the pressurized fuel between the orifices has a second pressure and the pressurized fuel between another of the orifices and the nozzle has a third pressure, the first pressure being greater than the second pressure and the second pressure being greater than the third pressure.

38. (Previously Presented)

The fuel transfer arrangement of claim 35 wherein the nozzle has a passage with a diameter, the passage defining the inlet and the outlet of the nozzle, and the orifices have diameters, the diameter of the passage in the nozzle being equal to or less than the diameters of the orifices.

39. (Previously Presented)

The fuel transfer arrangement of claim 32 wherein the nozzle has a passage with a diameter, the passage defining the inlet and the outlet of the nozzle, and the orifice has a diameter, the diameter of the passage in the nozzle being equal to or less than the diameter of the orifice.